

Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of claims:

1. (Currently Amended) A method of non-invasively analysing skin structure, the method comprising ~~the steps of~~:
 - (i) irradiating a plurality of locations over an area of tissue under investigation and detecting the light remitted at each location;
 - (ii) analysing the light remitted at each location and obtaining a measurement representing the total melanin and dermal melanin within the tissue;
 - (iii) comparing the measurement for the dermal melanin obtained in step (ii) with the measurement for the total melanin obtained in step (ii); and
 - (iv) using the comparison obtained in step (iii) to investigate the skin condition.
2. (Original) A method according to claim 1 where the dermal melanin measurement represents dermal melanin concentration.
3. (Original) A method according to claim 1 where the dermal melanin measurement represents dermal melanin depth.
4. (Original) A method according to claim 1 where the dermal melanin measurement represents dermal melanin volume.
5. (Currently Amended) A method according to ~~any preceding~~ claim 1 in which the dermal melanin measurement is shown as a false ~~colour~~ color image.

PRELIMINARY AMENDMENT

Title: METHODS AND APPARATUS FOR MEASURING TISSUE HISTOLOGY

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6. (Currently Amended) A method according to ~~any of any preceding~~ claim 1 in which an image is generated from the dermal melanin measurement made in step (ii).
7. (Original) A method according to claim 6 in which a texture measurement giving an indication of the texture of the image is calculated to give a measure of the total melanin.
8. (Original) A method according to claim 7 in which a standard deviation is used to calculate the texture of the image and provide a measure of the total melanin from the image.
9. (Currently Amended) A method according to ~~any preceding~~ claim 1 in which an image is generated from the total melanin measurement made in step (ii).
10. (Original) A method according to claim 9 in which a texture measurement giving an indication of the texture of the image is calculated to a give a measure of the dermal melanin.
11. (Original) A method according to claim 10 in which a standard deviation is used to calculate the texture of the image and provide a measure of the dermal melanin from the image.
12. (Currently Amended) A method according to claim 10 ~~as it depends from claim 7~~ further comprising:
generating an image from the dermal melanin measurement made in step (ii); and
calculating a texture measurement giving an indication of the texture of the image
to give a measure of the total melanin;

in which a comparison is made between the texture of the total melanin and the dermal melanin measurements.

13. (Original) A method according to claim 12 in which the comparison is made within regions where the dermal melanin is non-zero.

14. (Currently Amended) A method according to claim 12 ~~or 13~~ where the comparison is made by utilizing a ratio of texture measurements.

15. (Currently Amended) A method according to ~~any preceding claim~~ claim 1 which is used to infer information relating to skin malignancy.

16. (Currently Amended) A method according to ~~any preceding claim~~ claim 1 in which step (ii) provides a spectral measurement over said plurality of locations.

17. (Currently Amended) A method according to claim 16 which comprises mapping each spectral measurement into at least a two dimensional ~~colour~~color space.

18. (Currently Amended) A method according to claim 17 in which the two dimensions of the two dimensional ~~colour~~color space are arranged such that variations in blood concentration in the tissue have substantially no effect in that space.

19. (Currently Amended) A method according to claim 17 ~~or 18~~ which comprises, for each spectral measurement, calculating:

$$S(P_{ud}, P_{ld}, d_{ud}, d_{ld}, d_{l2}, d_{l3}, \phi, d_m) = \int_0^{\infty} R_{total}(P_{ud}, P_{ld}, d_{ud}, d_{ld}, d_{l2}, d_{l3}, \phi) \theta(\lambda, d_m)^2 S(\lambda) S_s(\lambda) d\lambda$$

where d_{l2} and d_{l3} are the depths of the d_{ud} and d_{ld} are the depths of the upper dermis and lower dermis respectively, Φ is the density of melanin.

20. (Currently Amended) A method according to claim ~~21~~ 19 which comprises plotting $S(P_{ud}, P_{ld}, d_{ud}, d_{ld}, d_{l2}, d_{l3}, \phi, d_m)$ in that space to provide a series of contours of increasing dermal melanin concentration at the papillary dermis depth.

21. (Original) A method according to claim 20 which comprises determining which contour is closest to the point represented by the spectral measurement ; using that contour to provide an approximate value for f_n (dermal melanin depth, dermal melanin concentration, epidermal concentration) for each location.

22. (Currently Amended) A method according to ~~any of claims~~ claim 16 to 21 in which the spectral measurements are calculated by calculating corrected ~~colour~~ color coordinates for each location corresponding to a predetermined papillary dermis thickness.

23. (Currently Amended) A method according to ~~any of claims~~ claim 16 to 22 in which the spectral measurements are calibrated to eliminate effects due to variations in collagen concentration.

24. (Currently Amended) A method according to ~~any of claims~~ claim 16 to 23, comprising the further step of making an array of f_n values corresponding to each measurement location.

25. (Original) A method according to claim 24, for investigating a lesion upon tissue under investigation, comprising providing a second array of values of total melanin at each location, using said second array to measure the texture of the total melanin distribution (TTM); using said first array to measure the texture of the dermal melanin distribution (TDM), calculating the melanin texture ratio (MTR) for the lesion $MTR = TDM/TTM$.

26. (Original) A method according to claim 25, in which the MTR is compared with a threshold value to identify lesions with a high possibility of malignancy.

27. (Currently Amended) A method according to claim 25 ~~or 26~~, in which the measurement of texture used for TTM is the same measure as used for TDM.

28. (Original) A method according to claim 27, in which the measurement of texture is by measuring the Standard deviation of the appropriate value.

29. (Curently Amended) A machine readable medium containing instructions which when read onto a machine cause that machine to perform ~~the method of any preceding claim~~ a method of non-invasively analysing skin structure, comprising:

(i) causing the machine to irradiate a plurality of locations over an area of tissue under investigation and detecting the light remitted at each location;

(ii) analysing the light remitted at each location and obtaining a measurement representing the total melanin and dermal melanin within the tissue;

(iii) comparing the measurement for the dermal melanin obtained in step (ii) with the measurement for the total melanin obtained in step (ii); and

(iv) using the comparison obtained in step (iii) to investigate the skin condition.

30. (Currently Amended) An apparatus arranged to non-invasively analyse the structure of skin comprising:

at least one light source arranged to irradiate the skin, and

a detector arranged to analyse light remitted from the skin to generate data representative of the remitted light and pass the data to a processor,

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the processor being arranged to process the data and obtain a measurement of the dermal melanin and the total melanin in the skin from the data and further arranged to make a comparison between the dermal melanin and the total melanin in order to infer determine the histology of the skin.